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Region 5 HAZARDOUS WASTE and TOXIC SUBSTANCES

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Region 5 HAZARDOUS WASTE and TOXIC SUBSTANCES

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Hazardous Waste

Bill Constantelos (center), director, Waste Management Division, EPA Region 5, discusses the impact of the new RCRA amendments with Lyman Wible (right), administrator, Division of Environmental Standards, Wisconsin Department of Natural Resources, and Gary Guenther (left), deputy director, Michigan Department of Natural Resources.

By B. G. Constantelos

We in the Midwest have our share of hazardous waste problems. Leaking dump sites are an all-too-familiar legacy of the heavy industry that has supported our economy for so long. EPA and many State agencies are responding to decades of careless and improper disposal practices in order to protect people and their property from leaking dumps and contaminated ground water.

EPA's main weapon in the fight against hazardous wastes is the $1.6 billion "Superfund," created by Congress in 1980 to finance the cleanup of the Nation's worst chemical dumps. Right now, there are 192 sites in Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin—Region 5's territory. We have begun the cleanup process at about 50 of these and are right now studying many more.

Several of the cleanups in our Region are real success stories, and we're proud of them. But nothing is accomplished in a vacuum, and we depend heavily on the input of local communities to get the job done in the best and most cost-effective manner possible.

We at EPA believe it is important for the public to understand how we are responding to hazardous waste emergencies and what we're doing to make sure similar problems don't haunt us in the future. The many articles in this publication should serve as a primer.

One of our biggest efforts right now involves prevention. Congress has recently given us new authority under the Resource Conservation and Recovery Act to more tightly regulate current hazardous waste disposal practices. This Region will be a national leader in working with waste generators and handlers to make sure that the new, more stringent, regulations accomplish what they're supposed to.

One of the articles you'll read concerns alternate treatment methods—new and different ways that are being developed to dispose of toxic wastes in the safest manner possible. In the meantime, we continue to rely heavily on land disposal, and another article deals with the difficult process of siting hazardous waste treatment facilities.

Our Region has been actively involved in the national dioxin strategy, an effort to determine the extent of dioxin contamination in the United States and to evaluate the health implications of it. About 150 locations in our Region are being sampled, and very encouraging study results have recently been announced for the City of Midland, MI, where the Dow Chemical Co. plant produced dioxin as an unwanted byproduct of pesticide production.

Properly managing hazardous wastes is a challenge to us all, but I am convinced this Agency's efforts will pay tremendous dividends to the Midwest in the form of a cleaner environment and fewer threats to public health.

EPA and States Use Superfund to Clean Up Hazardous Waste Sites

EPA faces no greater challenge than protecting America from the consequences of improper hazardous waste disposal. There are thousands of abandoned waste sites across the country; more than 3,900 have been identified in Region 5 alone.

Because of the threat these sites pose to human health and the environment, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in 1980. This law is commonly known as Superfund because it created a 5-year, $1.6 billion fund to finance the cleanup of hazardous waste sites throughout the Nation.

In 1985, CERCLA is expected to be reauthorized by Congress at an even higher level of funding. Eighty-seven percent of Superfund money comes from taxes on the manufacture or import of certain chemicals and petroleum and the remainder comes from general revenues.

The most important aspect of Superfund is that it allows EPA to act immediately when necessary to protect human health and the environment. Before Superfund, the Agency was unable to act swiftly. EPA is now authorized to clean up a problem if responsible parties are unable or unwilling to do so, and to later recover the cleanup expenses if possible.

EPA and the States have inspected 584 of the estimated 3,900 waste sites in Region 5 to determine the degree of hazard at each. Of the 584 sites inspected, 192 were considered serious enough environmental threats to warrant inclusion on the National Priorities List (NPL), a catalog of 812 sites nationwide which are eligible for Superfund cleanups. Because of its heavy industrialization and its dependence on ground water, the Midwest has more sites on the list than any other area of the country.

When a site is eligible for Superfund cleanup, either EPA or the State can take the lead in managing on-site activities. If EPA takes the lead role in the cleanup process, it enters into a contract with the State which specifies the State role and commits the State to pay its share of the costs. If the State takes the lead, the arrangement is formalized in a cooperative agreement with EPA. In this case, the State directly supervises the cleanup with EPA oversight. Regardless of which party takes primary responsibility, the States must be able to pay 10 percent of the cleanup costs or 50 percent if the site was owned by a municipality.

Three Region 5 States—Illinois, Michigan and Minnesota—often take the lead at Superfund sites. These States and Wisconsin also have their own "Superfund" legislation to help finance cleanups.

It should be noted that CERCLA distinguishes between emergency actions requiring immediate action to protect human health and sites that present a longer-range problem. EPA considers the special demands of each situation before deciding on the most appropriate response.

During the past 5 years, Region 5 has responded to emergencies at 84 sites (both on and off the NPL) and has started the investigation and long-term cleanup process at 85 NPL sites. Regional staffers are right now preparing plans to begin cleaning up 27 sites during Fiscal Year 1985 and another 25 sites in Fiscal Year 1986.

To date, Region 5 has obligated approximately $25.3 million for short-term emergency actions and $49.9 million for long-term measures at hazardous waste sites in the 6-State area.

CERCLA also authorizes EPA to require responsible parties to clean up their hazardous waste sites when those sites may be an imminent or substantial danger.

Region 5 technical staff and attorneys have been successful in getting responsible parties at 36 sites to agree to pay for or conduct cleanup operations. These agreements are valued at $112 million, leaving that much more money for use at sites where responsible parties cannot be located. The Region has lawsuits on 31 other sites pending.

WORK REMAINS AT CHEM-DYNE

The Chem-Dyne Corp. collected and disposed of chemical wastes at its Hamilton, OH site between 1976 and 1980. During that time, there were two fires and at least five fish kills due to operations at the site.

Operations ceased in February 1980, but more than 30,000 drums of waste and 300,000 gallons of bulk waste materials were left on site. In 1981, Chem-Dyne was added to EPA's National Priorities List for Superfund cleanup.

Some companies that had shipped wastes to the site voluntarily removed them between 1981 and 1983; in 1983, the U.S. Army Corps of Engineers removed the remaining surface wastes.

Now the remaining contamination in soil, ground water and on-site buildings will be addressed. U.S. EPA, U.S. Department of Justice and State of Ohio reached an agreement in June 1985 in which 160 companies will pay for the cleanup. The settlement calls for the most comprehensive groundwater cleanup yet developed in the Superfund program.

Groundwater will be extracted, treated and reinjected into the aquifer. In addition, on-site buildings will demolished, "hotspots" of highly contaminated soil will be removed, and a 5-foot cap will be built over the site. The groundwater treatment system will operate at least ten years, or as long as necessary to return the water to acceptable quality. The other measures will occur within a year.

EPA HELPS RESTORE BATTLE CREEK WATER

Three years ago, EPA and the State of Michigan discovered that 27 of 30 drinking water wells in Battle Creek, MI, were contaminated by varying amounts of volatile organic compounds (VOC's)—chemicals commonly used as solvents.

EPA that year declared the area eligible for Superfund money and began investigating the nature and extent of the contamination. When it became apparent that public health could be endangered by the water, emergency actions began. Eighty families with severely contaminated private wells were given bottled water.

But 36,000 other people still depended on city wells. As the problem worsened, the city blended contaminated and uncontaminated water in order to reduce the concentration of chemicals. But that wasn't an acceptable long-term solution.

As a result, EPA last year began work on a barrier system that draws water out of the contaminated portion of the aquifer and strips it of the VOC's. The system relies on strategically-placed "blocking wells" and an air stripping and carbon adsorption system.

Concurrently, three new wells were dug north of the blocking wells in the clean portion of the aquifer.

The contaminated plume has shrunk since EPA began its efforts, restoring 16 of the city's wells and eliminating the need to blend water. The stripping and blocking operations are ongoing, and EPA will remove the major source of the contamination to prevent any further environmental or health damage.

CLEANUP ONGOING AT A&F MATERIALS

Cleanup is underway at the A & F Materials Superfund site in Greenup, IL. Industrial waste materials were recycled into fuel oil and fire retardant chemicals during operations there between 1977 and 1980.

The facility was abandoned in 1980, with waste materials left in storage tanks, lagoons, and processing equipment. Four waste generators who stored their materials at the A & F site agreed in June 1984 to clean up the surface of the site at their own expense, and have removed more than 465 truckloads of contaminated sludge and soil. About 77,000 gallons of liquid materials were treated onsite or disposed of, while more than 340,000 gallons contaminated water were treated to meet State and Federal standards and were discharged to the nearby Embarras River.

The Illinois Department of Public Health has begun a health study to address concerns of Greenup residents.

The generators will continue the cleanup by removing contaminated soils, removing all on-site buildings and grading the site.

BERLIN AND FARRO SURFACE CLEANUP FINISHED

Following 14 months of negotiations with EPA, 87 private parties paid $14 million last year to clean up the Berlin and Farro incineration site in Genesee County, MI.

Ground water, soil, and on-site surface water had been contaminated by chemicals during the 10 years the site was used to incinerate and dispose of liquid and solid wastes. Conditions at the site prompted the State of Michigan and EPA to take emergency action beginning in 1981.

The State of Michigan that year declared the site a toxic waste emergency and began removing 15,300 cubic yards of contaminated sludge. EPA Region 5 fenced the site and took steps to control runoff in 1982.

The final surface cleanup was completed last October, ahead of schedule. About 1 million gallons of liquid wastes and 75,000 tons of solid wastes were removed from the site by contractors hired by the 87 responsible parties.

However, significant tasks remain in order to determine what contamination still exists and how it might affect public health and the environment. An ongoing investigation is examining:

- Hydrology
- Geology
- Soil characteristics
- The way in which the site is affecting area surface water
- Steps needed to mitigate any problems that are discovered.

National Dioxin Strategy Targets 150 Midwest Sites

About 150 locations in Region 5 are being sampled for dioxin contamination as part of EPA's two-year, $7.4 million national dioxin strategy.

The strategy is designed to determine the extent of dioxin contamination in the U.S. and the associated risks to humans and the environment, to clean up sites which threaten public health, to evaluate ways of preventing future contamination, and to investigate methods of destruction or disposal.

Dioxin, specifically 2,3,7,8-tetrachloro-dibenzo-p-dioxin (2,3,7,8-TCDD), is a contaminant inadvertently created during the manufacture of certain chemicals, including 2,4,5-TCP, an ingredient in some herbicides. It is perhaps the most toxic man-made substance known and poses a threat at levels that, until recently, were too minute to measure.

The chemical has become almost a household word during the past two years. Dioxin contamination in Times Beach, MO, prompted a government buyout in 1983. Vietnam veterans reported health problems they believed were linked to their exposure to "Agent Orange," a dioxin-tainted defoliant used by U.S. forces during the war.

In order to systematically determine the extent of dioxin contamination in the U.S., EPA has compiled a list of more than 1,000 locations for testing. These sites have been divided into seven "tiers" according to the previous uses of the properties.

For the majority of the sites, EPA investigators will be collecting samples with no advance expectation of finding contamination. When contamination is found, it is expected to be at very low levels, unlike sites found earlier in Missouri.

Tiers 1 and 2 are sites where 2,4,5-TCP was produced or disposed of, along with sites where 2,4,5-TCP was used as a precursor to make pesticides. Dioxin is most likely to be found at sites such as these. Region 5 has one tier 1 site and no tier 2 sites. When necessary, EPA will take remedial action at these sites.

Tiers 3-7 are industrial, commercial and agricultural sites where pesticidal products were blended or used. These include places where 2,4,5-TCP and its derivatives were formulated into pesticides (tier 3); incinerators (tier 4); sites where pesticides derived from 2,4,5-TCP have been and are being used on a commercial basis (tier 5); certain organic chemical and pesticide manufacturing facilities where 2,3,7,8-TCDD could have formed as the result of faulty or improper quality control (tier 6); and background sampling of fish or soils at sites where dioxin is not expected (tier 7). All but one of the Region's sampling locations fall in tiers 3-7. EPA does not expect to find any significant levels of dioxin at sites in these tiers.

Sampling may take several forms, depending on a preliminary analysis of where dioxin contamination would most likely occur. Soil and water samples may be taken at one site, while fish tissues and stream sediments may be tested at another.

The dioxin strategy is a comprehensive effort that is expected to provide a much clearer picture of the dimensions of the problem while allowing the Agency to plan appropriate measures to protect the public.

As part of the Agency's National Dioxin Strategy, soil samples were taken in Midland, MI and other representative communities to determine whether dioxin and other toxic chemicals in the soil presented a public health threat. Through this multiple testing approach, EPA can best determine the extent and nature of the contamination problem and possible solutions to it.

Sites with significant contamination and those which pose an immediate public health threat will be referred to EPA's Superfund waste cleanup program for action.

Most of the dioxin strategy's costs are being financed by a special appropriation from Congress. Sampling at tier 1 and 2 sites, however, is paid for by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), more commonly known as "Superfund."

In cases unrelated to the national dioxin study, two companies in Region 5 agreed to study their facilities for the extent of dioxin contamination and to consult with regional EPA staff on appropriate action.

Because a very important part of the dioxin strategy is to determine the health and environmental risks from exposure to dioxin, EPA will cooperate with other Federal agencies to research the specific effects of 2,3,7,8-TCDD on humans and other species. The Agency will be especially interested in developing techniques to understand actual risks posed by dioxin under differing conditions.

Although the precise ways in which dioxin affects the human body are not known, EPA's cancer assessment group regards the chemical as an initiator and promoter of cancer. That is, it is thought to cause cancer and to accelerate the formation of cancers caused by other means. EPA is working closely with the Centers for Disease Control in Atlanta on health issues related to dioxin.

Results from EPA's nationwide sampling program are expected by the end of 1985, when a report will be prepared for Congress.

Midland Dioxin
No Health Threat, Study Shows

A recent EPA study of dioxin contamination in Midland, MI, showed that the compound does not pose an unacceptable public health risk in that city.

Concern over dioxin contamination in Midland began in 1978, when the Dow Chemical Co. told the Michigan Department of Public Health it had found 2,3,7,8-TCDD, the most toxic of 75 related compounds known as dioxins, in fish caught in the Tittabawassee River. The public health department immediately advised against eating fish caught in the river—a warning that remains in effect today.

After a caged-fish study in 1981, EPA and the Michigan Department of Natural Resources (MDNR) determined that Dow's wastewater was the source of dioxin in the fish. In 1984, the State of Michigan ordered the company to reduce dioxin discharges by constructing wastewater treatment systems.

In 1983, the State of Michigan formally had asked EPA to study dioxins and other toxic pollutants at Dow's plant, in the Tittabawassee River, and in the City of Midland. EPA agreed, and sampled soil, wastewater, emissions, brine and river sediments during 1983 and 1984. During that period, EPA also sampled six other areas in the Midwest for comparative purposes.

The goal of the study was to determine if dioxin or other toxic pollutants in Midland soil could pose unacceptable public health risks. EPA wanted to identify the likely source or sources of dioxin in Midland; to determine if levels in Midland are comparable to other areas with combustion sources and process operations different from Dow's; and to see if levels at Midland were significantly different from background levels generally found in the environment.

The findings:

- Current dioxin levels in surface soils away from the Dow Chemical plant are well below 1 part per billion (ppb), the level at which the Centers for Disease Control feels some action must be considered to prevent human exposure.
- Dioxin was found inside the Dow Chemical property in quantities as high as 36 ppb in surface soils. Dow has agreed to cover two areas that have high dioxin concentrations.
- Concentrations of dioxin in Midland but outside the plant property are significantly higher than the trace levels found in a few samples taken in other cities. No detectable levels of dioxin were found in most samples from comparison sites, and in all samples from natural areas.
- Air emissions from Dow Chemical are the likely source of dioxin contamination in Midland.
- A warning against eating fish from the Tittabawassee River should be continued.
- Current levels of toxic organic pollutants in Midland soils are equivalent to those found elsewhere in the environment and do pose an unacceptable public health risk.

In order to interpret the Midland findings, EPA sampled four natural areas in Minnesota and the cities of Henry, IL, and Middletown, OH. These cities have manufacturing processes with wastes similar to those produced at Dow.

No detectable levels of dioxin were found in any of the pristine areas, suggesting that it is not present in all parts of the environment. Samples taken in Henry and Middletown also generally showed no detectable contamination. However, a few samples taken in those towns showed dioxin in amounts ranging up to .005 ppb.

EPA also compared the Midland dioxin levels to data from other chemical manufacturing and disposal sites where dioxin has been found. For the most part, levels of 2,3,7,8-TCDD at Dow Chemical are in the range of, or lower than, levels at eight other similar sites.

Because of continuing concern over relatively high levels of dioxin in game fish in the Tittabawassee River, people should not eat fish from that river. Dow Chemical, in a 1984 consent decree with EPA, has agreed to analyze fish from the river for dioxin levels' every two years between 1985 and 1991. This program will help determine if wastewater treatment systems at Dow result in lower dioxin levels in fish.

Region 5 Supports Emergency Team

Oil or chemical emergencies are rarely convenient and almost always dangerous. That's why each of EPA's 10 regional offices has a staff of emergency response professionals on call 24 hours a day.

The 16 engineers and scientists in Region 5's Emergency Response Section are based in Chicago and Grosse Ile, MI. They supervise immediate removals at uncontrolled hazardous waste sites and coordinate on-scene activities at major oil or hazardous substances spills. A multi-agency regional response team is available to support these efforts.

Most of the Emergency Response Section's work involves immediate removals at hazardous waste sites on and off the National Priorities List (NPL). The NPL is a catalog of 812 sites across the Nation that are eligible for Superfund-financed cleanups.

Immediate removals usually involve neutralizing, isolating or removing chemicals to prevent fires, explosions or public health risks. When an NPL site is involved, long-term cleanup plans are developed after the immediate hazards have been taken care of.

In at least three recent cases, emergency response activities involved supplying bottled water to some residents of Niles Township, MI; Byron, IL; and Elkhart, IN; after their wells were contaminated by leaking chemicals. In Wausau, WI, an emergency response involved installing carbon filters on a city drinking water well serving 3,500 people.

At the Saginaw Paint Co. in Michigan, an immediate removal in 1984 meant removing the contents of 1,000 drums, 200 yards of pigments and solids, and several thousand gallons of liquids from abandoned underground tanks. At the Midco II Superfund site in Gary, IN, EPA is supervising a surface cleanup that includes draining, sorting, and shredding thousands of contaminated drums.

EPA's national emergency response budget for Fiscal Year 1985 is $54 million, with $8.5 allocated for Region 5. Last year the Region spent $4.6 million on spill response and immediate removals, according to Gerald F. Regan, chief of the Emergency Response Section.

EPA Regulates Hazardous Wastes

If it's an ignitable, reactive, corrosive, or toxic waste, it's probably also a hazardous waste. And if you generate, treat, store, transport, or dispose of enough of it, you may have to follow EPA guidelines under the Resource Conservation and Recovery Act (RCRA).

RCRA, passed by Congress in 1976 and amended in 1984, was designed to improve the way industry handles hazardous wastes. The focus of the law is on industrial wastes which weren't traditionally regulated under EPA's other environmental programs.

RCRA actively involves EPA in managing hazardous wastes from the time they are created until their disposal or destruction. Through the use of "cradle to grave" waste tracking and a permit system, EPA and the States can ensure that wastes are being handled and disposed of properly.

The RCRA process starts with the generators of hazardous wastes. It is their duty to evaluate their waste streams and determine whether the wastes meet RCRA's definition of a hazardous waste. EPA currently lists more than 450 chemicals and other wastes that are automatically considered hazardous; the generator can use EPA's guidelines to evaluate other waste streams.

Is it ignitable? Is it corrosive? Is it reactive? Is it toxic? If more than 2,200 pounds (1,000 kg) of wastes are generated each month, they are regulated under RCRA. Certain highly toxic compounds, such as arsenic and some discarded pesticides, are regulated in quantities as small as 2.2 pounds (1 kilogram). In addition, the new RCRA amendments tighten the control over hazardous wastes by bringing small quantity generators—those who create between 220 pounds (100 kilograms) and 2,200 pounds (1,000 kilograms) of wastes in a month—under the purview of the law.

RCRA allows generators to store their own wastes onsite for as many as 90 days without a permit. Some facilities have chosen to limit the amount of time they store hazardous wastes in order to avoid having to get a RCRA permit.

When wastes are to be shipped offsite, the generator must prepare a manifest which describes the wastes and identifies the transporter and the facility to which the wastes will be shipped. Wastes may only be sent to facilities with RCRA permits or with interim status. (RCRA permits may be issued by those States authorized by EPA to do so.)

Hazardous waste transporters also have responsibilities under RCRA. Transporters are required to carry manifests prepared by the generator and must follow all applicable U.S. Department of Transportation safety regulations.

Treatment, storage and disposal facilities (TSD's) are subject to RCRA's most stringent provisions. The law requires EPA to issue permits for these facilities so they will make the minimum impact on the environment.

RCRA regulations for land disposal facilities are primarily concerned with protecting ground water. These facilities, including landfills, must install monitoring wells and check them quarterly or semi-annually for any evidence of leakage from the site. If contaminants are found in the monitoring wells, the facility must stop the leak and remove or treat the contaminants.

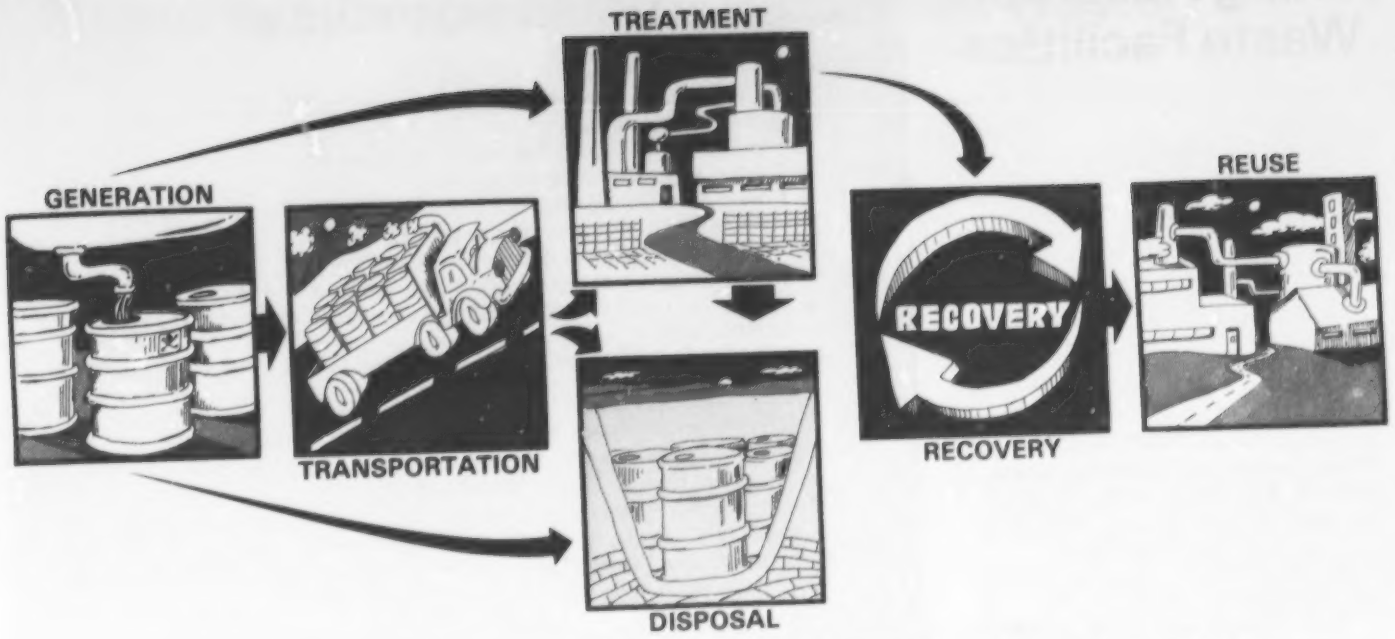
The recent amendments to RCRA significantly strengthen EPA's ability to protect ground water. For instance, the law now requires EPA to regulate underground storage tanks—thought to be the biggest threat to ground water—by developing standards for the design, construction, and installation of new tanks.

In addition, EPA will develop standards to protect human health and the environment from the dangers posed by existing leaking underground storage tanks. The Agency will require leak detection or inventory systems, recordkeeping and reporting by tank owners, and closure procedures when a tank is to be taken out of commission.

RCRA regulations also specify certain controls to limit the creation or escape of leachate, liquid that forms as wastes decompose in a landfill. Safeguards such as synthetic liners, leachate collection systems and runoff controls are specified for landfills. Even more important, EPA will prohibit the land disposal of bulk or non-containerized liquid hazardous wastes as of May 7, 1985. RCRA permits for landfills will be reviewed every 5 years.

TSD's must also develop contingency plans for protecting health and the environment, provide closure and post-closure plans and provide proof of financial responsibility.

There are about 1,240 TSD's in Region 5, according to Edith Ardiente, chief of the regional RCRA Technical Programs Section. Most of these facilities have what EPA calls "interim status" until a decision is made on whether they qualify for a RCRA permit. Facilities must comply with



A HAZARDOUS WASTE WILL BE TRACKED FROM 'CRADLE-TO-GRAVE'

EPA's interim status standards, which specify how hazardous wastes must be managed.

Part A permit applications tell the Agency who owns the facility, where it is located, any other environmental permits held, and a written description of operating procedures, quantities and types of wastes involved, and photographs of the operation.

Interim status enables existing facilities to operate until they can be evaluated for complete, or Part B, permits. So far, the Region has determined that six facilities cannot meet RCRA standards. Because EPA denied permits for those operations, they must be closed down.

The Region 5 RCRA staff is now reviewing 142 Part B applications and have so far issued 54 RCRA permits. *Applications for incineration* and land disposal facilities are given top priority in the review process.

Once EPA has evaluated a Part B permit application, it advertises in local media its intent to issue or deny the permit. There is a 45-day comment period and, if requested, a public hearing in the community where the facility is located.

As with many environmental laws, RCRA provides for the States to take over the day-to-day running of the program. Minnesota has already received authorization to do that, and four other States—Illinois, Indiana, Ohio, and Wisconsin—have been authorized to regulate interim status generators, transporters and TSD's. In order to be authorized to run the RCRA program, States must demonstrate that their laws and regulations are at least equivalent to and consistent with Federal regulations. States must continually update their programs to keep them consistent with Federal requirements.

EPA and the States inspect TSD's to make sure they are complying with their interim status requirements or their RCRA permits. When violations are found, EPA or the State issues a warning letter or a compliance order, which specifies what the permit holder must do to remedy a violation and may also assess a fine. In very serious cases, the Agency can suspend or revoke a permit.

Region 5 issued 84 compliance orders and 688 warning letters during Fiscal Year 1984. The Region assessed more than $2.3 million in fines in its compliance orders during that year, according to Bill Miner, chief of the regional Hazardous Waste Enforcement Branch. The States of Indiana and Minnesota, the only ones in Region 5 with the authority to issue RCRA compliance orders that assess penalties, issued 28 orders during Fiscal '84. Altogether, Region 5 States issued 879 warning letters during the same period.

RCRA provides for fines of up to $50,000 per day of non-compliance and criminal prosecution in some cases. The act makes it illegal to knowingly transport hazardous wastes to a TSD without interim status or a RCRA permit or to cause wastes to be transported in that manner; to treat, store or dispose of hazardous wastes without interim status or a permit; or to falsify any RCRA-related documents.

A 1980 amendment to the law created a new felony offense called "knowing endangerment"—putting another person in imminent danger of death or serious bodily injury. A conviction under this provision can result in a fine of up to $1 million for a corporation and up to $250,000 for an individual. It can also result in imprisonment.

A particularly significant addition to the law was included in the 1984 amendments to RCRA—it allows citizens to file suit when a waste site poses an imminent or substantial hazard.

Siting Hazardous Waste Facilities

THE SITING PROCESS

The Siting Process should:

- Be well thought out by site developers, facility operators, and government agencies;
- Provide for early and full public information and participation;
- Be understandable to the public;
- Provide the public with accurate information concerning the benefits, risks, and alternatives to a proposed facility;
- Address the legitimate concerns of all parties;
- Be a shared consultative process among site developers, facility operators, communities, government agencies, and other affected parties; and
- Provide opportunities for all concerned parties to negotiate areas of dispute.

Furthermore, an evaluation of a proposed facility should include an assessment of:

- The need for a facility of some sort;
- Whether the proposed facility represents the most appropriate technology for handling the particular wastes; and
- Whether the location proposed for such a facility is suitable given environmental, social, and economic concerns.

Reprinted with permission from *Siting Hazardous Waste Management Facilities, A Handbook*. Published by the Conservation Foundation, Chemical Manufacturers Association, National Audubon Society, 1983.

Siting commercial hazardous waste facilities is a critical aspect of waste management, but it's very hard to do.

Love Canal and other highly publicized incidents have contributed to a phenomenon known as the "not-in-my-backyard" syndrome, or NIMBY. This syndrome makes it difficult to find places where even well-run and properly safeguarded facilities can function.

The location of a hazardous waste treatment, storage or disposal facility is a tremendously important consideration in the overall success of the operation. Hydrology and geology, for example, are two critical parameters to be considered when locating land disposal operations such as landfills and deep injection wells.

The impact of any waste facility will depend on its design, purpose, and proximity to people, transportation routes, water supplies and important ecological systems. The operator's past record is also important, and many States consider it during the permit evaluation.

Although Federal regulations developed under the Resource Conservation and Recovery Act (RCRA) affect siting decisions, choices about where to build treatment, storage, and disposal facilities are largely left to State and local governments.

Concerns about health risks, potential ground-water contamination, and equity must be addressed, and many States have hazardous waste facility siting laws to provide a structured decision-making process. Five of this Region's six States, for example, have such laws.

Siting laws generally create a State board to identify and evaluate potential hazardous waste facility sites. Sometimes these boards actively seek out such sites and are involved in statewide hazardous waste planning; in other cases the boards review permit applications and make the final decisions on where a proposed facility will be located. The State boards usually can override local objections, but often will include local ordinances as permit conditions.

Several States in Region 5 require deed covenants to restrict the future use of the land on which a facility has operated. Bonds or other sureties are frequently required to guarantee the financing of closure and post-closure monitoring.

One of the main problems confronting State governments and the people involved in building hazardous waste facilities is public distrust. Citizens perceive site selection processes to be inequitable. State siting laws help remedy that by requiring that environmental factors be considered and that the community is protected.

EPA feels that citizens are more inclined to make siting decisions on merit, rather than emotion, if they have complete answers to questions such as these: Will the facility cause health problems? How will compliance with environmental laws be monitored? What plans have been developed for emergency situations? Is the facility needed?

In the event that well-thought out proposals aren't enough, some States actually provide communities with financial incentives to allow hazardous waste facilities within their borders. In Indiana, for example, the host county receives 50 cents for each ton of waste disposed of in or on the land. EPA encourages States to use fee systems and other means to help finance their hazardous waste programs.

Changing waste disposal practices, State planning and siting policies, and increasingly tough EPA regulations are expected to result in less wastes and more responsible disposal in the future. The recent RCRA amendments require EPA to develop criteria for the location of hazardous waste facilities as necessary to protect human health and the environment. An EPA task force has been established to address those concerns.

Alternative Treatments for Hazardous Waste

Editor's Note: This article was adapted from an October, 1984, EPA Journal article by Donald White and Bob Burke entitled "Choices in the Disposal of Hazardous Waste."

EPA's regulations under the Resource Conservation and Recovery Act (RCRA) are designed to make land disposal of hazardous wastes safer, but even the toughest regulations don't come with guarantees.

In view of the drawbacks inherent in land disposal, there is a growing consensus that the Nation should move as rapidly as possible toward treatment and recovery as the preferred means of managing hazardous wastes.

As a consequence, Congress recently amended RCRA to include an explicit provision against the land disposal of particular wastes unless it can be demonstrated that human health and the environment would be protected during the full life of their disposal.

[There is evidence that industry is moving away from its reliance on landfills in favor of treatment and incineration. In Illinois alone, 81.7 percent of all RCRA manifest wastes were landfilled in 1980. But by 1983, that figure had dropped to 42.6 percent, according to a 1983 report by the Illinois Hazardous Waste Task Force.]

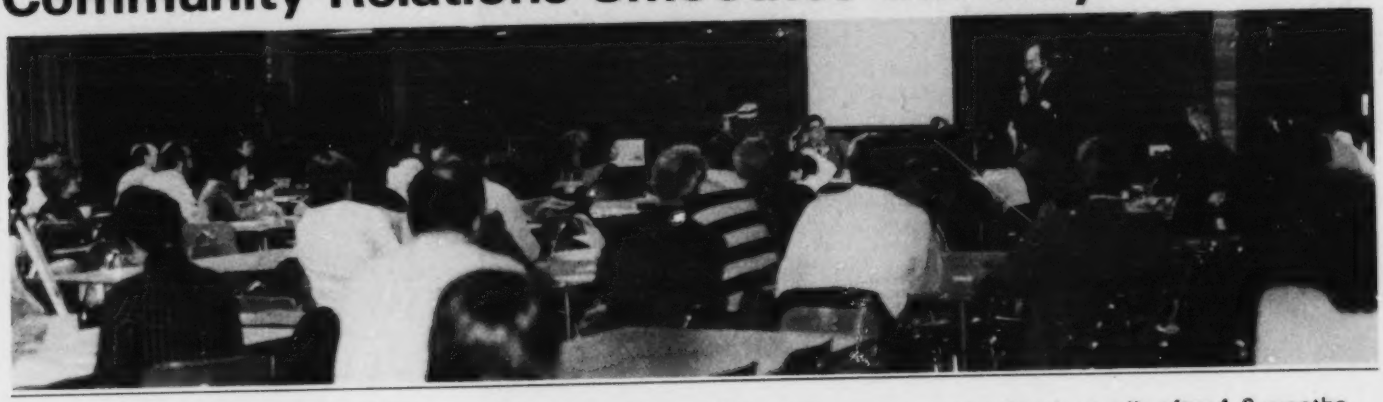
EPA wants to encourage this trend by discovering, testing and promoting feasible technologies for treating and recovering those kinds of hazardous waste that will ultimately be banned from land disposal.

EPA's treatment, recycling and reduction program is examining the following technology:

- **Biological treatment processes** that employ living organisms to feed on and decompose certain wastes.
- **Dechlorination** that detoxifies chlorinated substances by adding nontoxic products such as hydrogen.
- **Carbon adsorption** involving the use of specially-treated carbon to retain wastes, a technique that has proven particularly useful for removing organic compounds from wastewater.
- **High temperature incineration** leading to thermal destruction of wastes—an effective way to destroy many organic compounds.
- **Neutralization** of wastes that are either too acidic or alkaline. Neutralization involves combining proper concentrations of acid substances or wastes with alkaline substances or wastes.
- **Oxidation** of primarily organic materials, including cyanides, phenols and organic sulfur compounds, essentially involving a chemical reaction that transforms these wastes into harmless carbon dioxide and water.
- **Precipitation technologies** that transfer certain soluble constituents of liquid wastes into solids suitable for sedimentation. This is a particularly useful means of removing metals from water.
- **Recovery/reuse/recycle processes** that not only remove hazardous wastes from the environment but provide for their productive reuse. Solvents, acids and metals are among the products frequently recovered.
- **Solidification and stabilization** processes that ultimately turn wastes into a solid mass. The wastes cannot then be easily transported by water or other liquids into the environment.

EPA's existing research suggests that many of these alternative technologies can be used or are already being used to treat and recover various hazardous wastes. Many solvents, for example, are already being recycled or incinerated. But it is going to take an impressive amount of research, field work and cooperation with the private sector to make sure these alternatives are available when needed.

Superfund Isn't Usually "Superfun;" Community Relations Smoothes the Way



Anywhere there's a Superfund site, there are people with questions. Is the drinking water safe? Will EPA protect the community from hazards? When will the problem be taken care of?

The people who answer these questions and provide a direct link between EPA and the communities at Region 5's 187 Superfund sites are project managers and community relations coordinators.

Project managers are professionals who typically have degrees in engineering or earth sciences. Community relations coordinators are public affairs specialists with in-depth environmental backgrounds.

The two professionals work as a team to provide citizens, elected officials, State agencies and the media with accurate and up-to-date information about the work going on at a given site.

"We want to tell people what's going on and we feel an obligation to do that," said John Perrecone, the lead community relations coordinator in Region 5. "The people appreciate the fact that we talk to them in their homes and communities."

With the exception of sites where EPA takes emergency action because of immediate health or environmental threats, most Superfund cleanups are multimillion dollar undertakings that require substantial planning and engineering work.

The first step in any cleanup is what EPA calls a *remedial investigation.* EPA or its consultants carefully study the site to assess the type and extent of contamination and the possible risks to people living nearby. These investigations can take as long as two years, but usually average 14 months.

The Agency's commitment to keeping people informed begins right after a Superfund site is scheduled for EPA action. Community relations plans are individually tailored to provide EPA professionals with essential background on the site and the community in which it is located. The plans also outline a schedule of community relations activities and opportunities for public participation.

Once a remedial investigation is scheduled, the project manager and community relations coordinator for that site will hold a public meeting in the community. The meeting is to acquaint citizens with the Superfund cleanup process and the employees involved.

Citizens frequently take this opportunity to make comments that help EPA with the investigation. For instance, residents of Gary, IN pointed out that the Lake Sandy Jo Superfund site floods at certain times of the year, washing onto private property. They also noted that it might be a good idea to test a local spring where many people get their drinking water. As a result, EPA altered its remedial investigation to include those concerns.

Citizens are urged to keep in touch with EPA between meetings by calling a toll-free number when they have questions or want to check on the progress being made. In addition, documents related to the cleanup are kept in a notebook "repository" at a local library or the village hall.

After the remedial investigation is finished, a *feasibility study* is prepared. This study examines various ways of solving the problems at the site. Once the feasibility study is completed, usually after 4-6 months, another public meeting is held to solicit comment on the alternatives presented in it.

The Federal law that created Superfund, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), does not specifically require this degree of public input. But the Agency itself has made this a priority at all sites—"a good sign of the Agency's commitment," said Community Relations Coordinator Margaret McCue.

Perrecone, McCue and three other community relations coordinators in Region 5 have devised many ways of keeping in touch with communities scattered around the 6-state Midwest area. They periodically mail fact sheets to citizens, elected officials and reporters. Press releases announce timely and important developments; trips and frequent phone calls keep channels of communication open.

This communication is often positive, said Community Relations Coordinator Judy Beck. Cities with Superfund sites are usually eager to have them cleaned up, and "for many little towns, any Federal money coming in is positive."

Even when tensions are high and disputes are raging over the particulars of a given cleanup, citizens seem to appreciate having personal contact with EPA. "People, no matter how annoyed or concerned, always say at every single meeting I've been to that they appreciated us being there and talking to them," said McCue.

Toxic Substances

Bill Sanders (right), director, Environmental Services Division, EPA Region 5, attends a briefing with Valdas Adamkus (left), regional administrator, EPA Region 5.

By William H. Sanders, III

Chemicals play an important role in protecting, prolonging and enhancing our lives. But in the past few years, we have discovered that some common and widely-used chemicals, such as PCB's, have created significant health and environmental dangers. Part of the Agency's mandate is to eliminate or minimize those dangers, and we do so under the authority of two laws — the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA).

FIFRA and TSCA differ from other environmental laws such as the Clean Water Act because they focus primarily on the marketing, use and distribution of specific chemicals—not the disposal of them.

The Agency uses the authority of FIFRA and TSCA to control chemical manufacturing and use by establishing standards, issuing permits, inspecting facilities, and taking enforcement action when necessary. The statutes also provide the foundation for the Agency's decisions on the continued marketing of pesticides and other toxic chemicals. EPA is committed to assessing the risks and benefits of chemicals in the marketplace and to controlling those that may threaten health or the environment.

EPA has been using risk assessment as a management tool for some time, even though the process is not thoroughly understood. The Agency is devoting considerable effort to risk management, and in cooperation with other agencies, has refined the process significantly. Risk assessment guidelines for mutagenicity, cancer, reproductive disorders, systemic effects and chemical mixtures are now available to help EPA set priorities.

Asbestos, and particularly asbestos in schools, is emerging as a priority regional activity. The program requires local education agencies to assess and document whether their schools contain friable (easily crumbled) asbestos. We in Region 5 have so far inspected more than 1,000 of our 23,000 schools to see if they are meeting the requirements of our asbestos-in-schools rule. Nationally, 60 percent of school districts are not doing so. To help needy school districts finance asbestos removal, EPA has recently begun a no-interest loan and grants program which will actively involve Region 5's asbestos staff.

Protecting health and the environment from toxic chemicals is not the exclusive responsibility of EPA. Congress has directed the Agency to establish active partnerships with the States, where possible, in environmental protection efforts. As a result, all six States in Region 5 are primarily responsible for enforcing pesticide regulations. Two States, Michigan, and Ohio, have the authority to perform PCB inspections under TSCA.

We have made significant progress in controlling toxic chemicals since TSCA and FIFRA were enacted, but we still have a long way to go. I hope you will find this publication a useful tool in gauging our progress so far.

Asbestos In Schools

EPA will inspect more than 500 school districts in Region 5 this year to see if they are complying with the Agency's asbestos-in-schools rule, which required all elementary and secondary schools to be inspected for friable (easily crumbled) asbestos by June, 1983.

The rule is designed to limit the exposure of students, teachers, and staff to microscopic asbestos fibers released into the air from deteriorating ceiling tiles or sprayed-on insulation.

Asbestos is a common name for several silicates—natural minerals that easily separate into thin fibers of exceptional strength. Chemically inert, heat resistant and stable, asbestos is, or recently has been, used in the U.S. as a fire retardant or insulator in some 3,000 different products.

Unless it is sealed or encased, asbestos can break into a dust of microscopic fibers that are easily inhaled or swallowed. The presence of the fibers in the body, usually the lungs, can lead to lung cancer, asbestosis, and mesothelioma.

Asbestosis is a disease that makes breathing increasingly difficult and, in severe cases, can cause death. Mesothelioma is a cancer of the linings in the chest and intestinal tract. All of these diseases can take 20 to 40 years to develop.

School districts are required to post notices and inform parents, students, teachers, and school employees when friable asbestos is found in schools. Although EPA's rule does not require asbestos abatement measures, districts typically choose to seal, encase or remove it.

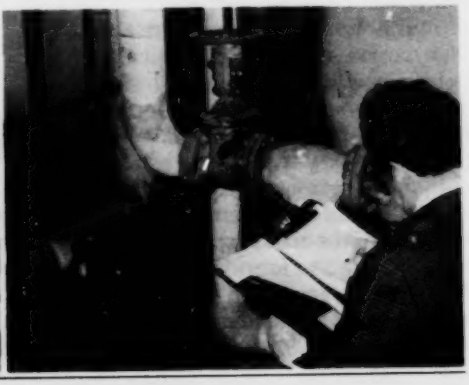
EPA estimates that approximately 15 million students and 1.4 million teachers and school employees use buildings that contain some friable asbestos material. However, this does not mean that these children and employees are breathing asbestos. It is only when friable materials are damaged or degraded that they can release the asbestos fibers into the air. If friable materials are properly encapsulated or enclosed, there is no threat to human health.

Preliminary surveys show that two-thirds of the school districts in the country with asbestos problems are correcting them.

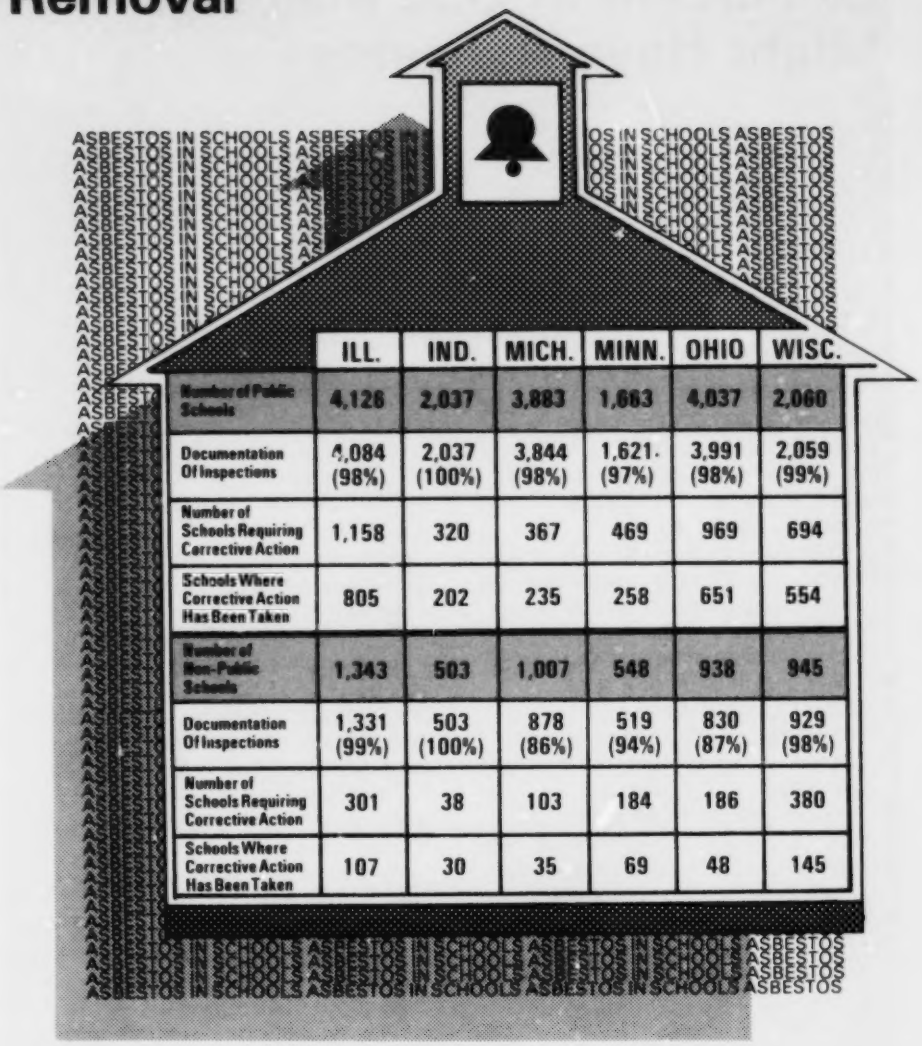
EPA inspections of 339 school districts in Region 5 during Fiscal Year 1984 showed that 116 were complying with the asbestos-in-schools rule. Tony Restaino, Region 5 Asbestos Coordinator, said he uses a neutral inspection scheme to determine which districts to inspect. Factors considered are size, complaints, or lack of records on district compliance with the asbestos-in-schools rule.

Restaino said citizens often call him complaining that they cannot get information from their districts or that asbestos has been found but the district doesn't want to take any action. Complaints can often be resolved over the phone, he said.

To help school districts finance asbestos abatement projects, Congress recently appropriated $50 million for EPA to disburse in the form of no-interest loans and grants. The schools that will receive the money will be selected by the States and EPA, and will be announced in June, 1985.



Loans to Help Schools Finance Asbestos Removal



	ILL.	IND.	MICH.	MINN.	OHIO	WISC.
Number of Public Schools	4,126	2,037	3,883	1,663	4,037	2,060
Documentation Of Inspections	4,084 (98%)	2,037 (100%)	3,844 (98%)	1,621 (97%)	3,991 (98%)	2,059 (99%)
Number of Schools Requiring Corrective Action	1,158	320	367	469	969	694
Schools Where Corrective Action Has Been Taken	805	202	235	258	651	554
Number of Non-Public Schools	1,343	503	1,007	548	938	945
Documentation Of Inspections	1,331 (99%)	503 (100%)	878 (86%)	519 (94%)	830 (87%)	929 (98%)
Number of Schools Requiring Corrective Action	301	38	103	184	186	380
Schools Where Corrective Action Has Been Taken	107	30	35	69	48	145

EPA this June will distribute $45 million in grants and no-interest loans to the country's neediest schools for asbestos encapsulation and removal projects. The money, available under the Asbestos School Hazard Abatement Act of 1984, is meant to protect school staff and students from serious asbestos hazards.

Asbestos is the common name for several silicates—natural minerals that easily separate into thin fibers of exceptional strength. Chemically inert, heat resistant and stable, asbestos was widely used between 1940 and 1979 in fireproofing, insulation and acoustical materials.

When asbestos fibers are tightly bound into a product, they pose no danger—it is only when asbestos materials deteriorate and crumble that they can release asbestos fibers into the air to be inhaled by people. Exposure to asbestos can cause lung cancer; mesothelioma, a serious lung disease; and other cancers.

EPA for several years has administered an asbestos-in-schools program that requires school districts to inspect their buildings and to notify parents and school employees when friable (easily crumbled) asbestos is found. It is the Agency's policy to provide school districts with technical expertise and other assistance to reduce human exposure to asbestos.

The new loan and grants program marks "the first time in its history that EPA has ever made grants to schools," said Dr. John A. Moore, EPA's assistant administrator for pesticides and toxic substances. Moore stressed, however, that this money will be made available only to the Nation's neediest school districts on a site-by-site basis. Projects completed before January 1, 1984, are not eligible.

Application packages for the loans and grants were mailed last December to all public school districts and private school organizations. Designated State agencies were to receive the completed applications by mid-February and rank them according to degree of hazard. The hazard ranking process considers the condition of the asbestos in question, whether it's exposed, if it's in an air flow, and if it's friable.

The hazard rankings were to be submitted to EPA in Washington by mid-March for the final hazard ranking and financial need assessment. No-interest loans with a 20-year payback period will be the most common form of financial help, but poorer schools are eligible for grants to cover as much as 50 percent of the asbestos removal's cost.

Grants and loans are to be announced June 6 so that removals and encapsulations can be done during the summer, while students are away from school.

School districts with questions about the asbestos assistance program may call EPA's toxic substances toll-free number at 800-424-9065, the appropriate state agency, or EPA's regional asbestos professionals at (312) 886-0769.

EPA Survey: 20 Percent of U.S. Buildings Might Have Asbestos

As many as 700,000 commercial, residential (apartment) and Federal Government buildings in the U.S. could contain friable asbestos, a recent EPA survey shows.

Extrapolating from a sample of 231 buildings, the Agency estimates that:

- About 20 percent of all buildings (700,000) in the U.S. contain some type of friable asbestos material.
- Five percent of all buildings (200,000) have sprayed-on or trowelled-on asbestos materials containing an average of 14 percent asbestos.
- Sixteen percent of all buildings (550,000) have asbestos-containing pipe and boiler insulation with an asbestos content of 70 percent.
- About 2,000 buildings, or .1 percent of all buildings, have asbestos-containing ceiling tile with an average asbestos content of three percent.

Asbestos, valued for its heat and fire resistant qualities, was widely used in construction between 1940 and 1973, when most uses of it were banned. Often, city building codes specified that asbestos be used for insulating or fire retardant purposes.

While EPA is concerned about the number of buildings that contain asbestos, the mere presence of asbestos does not necessarily mean there's any health risk. Asbestos only poses a threat when friable material degrades or is damaged, Agency officials stress.

EPA recently surveyed 220 of its 273 buildings to see if any of them contained asbestos. Lab results confirmed sprayed or trowelled-on asbestos in occupied areas of 12 of these buildings, with asbestos found in pipe wrap, ceiling tiles or remote locations of 31 others. Fifty-three warehouses and other buildings only occasionally occupied by EPA employees are still being surveyed.

The 42 buildings with asbestos were immediately surveyed by EPA health hazard teams consisting of one technical expert, one asbestos coordinator and one industrial hygienist. The teams determined that employee health could be at risk in the 12 buildings where asbestos had been discovered in occupied areas.

Forty employees at a building in Research Triangle Park, N.C., were evacuated because of asbestos dust found in various office furnishings. EPA office workers in Denver were permanently transferred to another building because asbestos above the dropped ceilings was being disrupted by remodeling work. Operation and maintenance plans were immediately developed to eliminate the hazard in the other buildings.

EPA is expanding its asbestos program to include a contractor certification program and to establish asbestos information centers in Georgia, Kansas and Massachusetts.

The Agency will also extend its technical assistance program to cover potential hazards in public and commercial buildings, consider establishing regulations to protect workers who remove or encapsulate asbestos, and educate custodians and others about how they can minimize their exposure to asbestos during normal maintenance work.

These actions were announced by the Agency last December in response to a petition by the Service Employees International Union (SEIU).

New Rules To Cover PCB Transformer Fires

When electrical transformers catch fire there is often more to worry about than extinguishing the blaze. If the transformer contains polychlorinated biphenyls (PCB's) then the smoke and soot from the fire could blanket firefighters and innocent bystanders with toxic compounds.

In order to minimize this exposure, EPA recently proposed regulations that will require certain controls on transformers containing PCB fluid. The new regulations will require:

- Immediate registration of all PCB transformers with the appropriate local fire department.
- Immediate marking of PCB transformer locations with PCB identification labels.
- Immediate removal of stored combustibles from PCB transformer locations.
- Immediate registration with building owners of all PCB transformers located in or near buildings.
- The installation of additional electrical protective devices on certain voltage systems located in or near buildings.
- The isolation of all PCB transformers near or in buildings from ventilation equipment and ductwork that could spread toxic smoke from the fire throughout the building.

EPA banned the manufacture and distribution of PCB's in 1979, citing toxicity to humans and animals and the persistence of the compound in the environment.

However, the Agency allowed continued use of PCB fluids in electrical transformers as dielectric, or insulating, fluid. The heavy, oil-like

fluids are known for their stability, low flammability, high heat capacity, and low electrical conductivity. A typical PCB transformer holds about 200 gallons of fluid with a PCB concentration of about 50 to 60 percent. Some transformers can hold as many as 1,000 gallons of PCB liquid.

In the rare cases when these transformers catch fire and incomplete combustion occurs, relatively large amounts of toxic products can form.

If the transformers are near building ventilation equipment and ductwork, these compounds can spread throughout a building, exposing hundreds or thousands of people to substances that have produced unusually toxic effects in laboratory animals.

The substances of most concern to EPA are 2,3,7,8-tetrachloro-dibenzo-p-dioxin (2,3,7,8-TCDD, or dioxin) and 2,3,7,8-tetrachloro-dibenzofuran (2,3,7,8-TCDF). Other potentially dangerous compounds may also be produced and released during PCB transformer fires.

EPA believes that firefighters, when responding to a transformer fire, need to know if PCB's are present so they can wear the proper respiratory devices and protective clothing to guard against the combustion products. Bystanders should be evacuated, as should building occupants if the smoke and soot have gotten into the ventilation system.

The relative risk posed by PCB transformer fires will depend on the concentration of PCB's in the dielectric fluid. Transformers containing 50 to 60 percent PCB's will pose much greater risks of significant exposures than transformers containing a smaller concentration.

The Agency feels that the additional transformer control measures in the proposed rule will avert about 38 serious PCB transformer incidents during the remaining useful life of PCB-containing equipment.

The proposed transformer fire rule is scheduled to be issued July 1.

SUMMARY OF PCB REGULATIONS

Polycholorinated biphenyls (PCB's), a once-popular insulating fluid in electrical transformers and capacitors, are carefully regulated by EPA because of their toxicity and persistence in the environment.

EPA regulations prohibit the manufacture of PCB's, require the phase-out of existing uses, and specify disposal methods. There are penalties as high as $25,000 a day for not complying with the rules.

Congress directed EPA in 1976 to regulate PCB's because it believed that the compound posed a significant risk to public health and the environment. In 1979, EPA banned the manufacture of PCB's and outlawed most uses.

The current PCB regulations pertain largely to those who use, store or dispose of electrical equipment that contain PCB's. The major provisions of the regulations are summarized below:

USE — PCB transformers (containing fluids with more than 500 parts per million PCB's) must be inspected every three months for signs of leakage. Inspection records must be maintained and leaks must be promptly cleaned up.

MARKING — PCB transformers, large high-voltage PCB capacitors in service, large low-voltage PCB transformers at the time of removal for disposal, PCB containers in storage for disposal, and PCB storage areas must be marked with the M_ label specified in the regulations.

RECORDKEEPING — A concise annual summary document must be prepared to account for all PCB activity during each calendar year. This document applies to in-service PCB equipment, stored PCB equipment and disposed PCB's.

STORAGE — Storage areas for PCB's and PCB items must meet certain conditions such as adequate roof and floors and continuous curbing to contain spills.

DISPOSAL — Transformer fluids (containing more than 500 ppm PCB's) must be destroyed *only* by high-temperature incineration in an EPA-approved incinerator. Other PCB's, in concentrations between 50 and 500 ppm must be disposed of in high-efficiency boilers, approved chemical waste landfills or high-temperature incinerators. Fluids with less than 50 ppm PCB's cannot be used as a sealant, coating, or dust control agent but may be disposed of in a chemical waste landfill. Regulations also apply to the disposal of PCB solids and equipment.

For more information about the PCB regulations, call EPA's Toxic Substances Control Act assistance number at 800-424-9065.

Risk Assessment

EDITOR'S NOTE: This article was adapted from EPA Journal and an EPA report entitled Risk Assessment and Risk Management: Framework for Decission Making.

The goal of the EPA is to improve the condition of the environment—to reduce risks to human health, and to protect and enhance the quality of natural ecosystems. This much has always been clear, but the more recently understood threat of toxic chemicals has greatly increased the difficulty of carrying out that assignment.

To develop priorities and to act constructively in a highly uncertain environment, the Agency is relying heavily on the techniques of risk assessment and risk management.

Risk assessment is the process used to estimate risks to the public health. Because of the uncertainties in currently available scientific information, the Agency estimates risk conservatively. Risk management looks at the economic and social implications of varying levels of protection against certain compounds.

EPA's objective is not to join risk assessment and risk management, but to separate the two clearly so that scientific judgments (risk assessment) can be made independently and then balanced against economic, social and community considerations (risk management). EPA's risk assessment logic basically asks four questions.

- How hazardous is the substance?
- How much is harmful?
- What is the nature of exposure?
- What are the risks in a particular situation?

In order to improve this process, EPA has proposed new guidelines to improve consistency and credibility. Specifically, the Agency considers the following health risks:

- Cancer.
- Mutagenicity.
- Reproductive effects.
- Systemic effects (effects on other body systems).
- The effects of chemical mixtures.

The Agency feels that since risk management involves statements about values, the public has a right to know what values EPA is applying. It is essential that we address the worst and most-controllable risks first and the risk assessment/management process is helping us do that. Despite its uncertainties, it's the only tool we have right now for discriminating among environmental health problems.

Pesticides Regulated by EPA

Herbicides, fungicides, and insecticides all are chemicals that fall under the general heading of "pesticide." Whether they're designed to kill weeds, fungus, or crop-eating bugs, they are toxic compounds whose manufacture, distribution and use is controlled by EPA.

EPA requires all pesticides used in the United States to be registered with the Agency before they are marketed for use. In order to obtain a registration, a manufacturer must provide EPA with information about the pesticide's contents, toxicity, persistence in the environment, short- and long-term environmental effects, safety and use, and effects on humans and the environment.

Once this information is available, EPA specialists determine if the product can perform its intended function without causing "unreasonable adverse effects" on human health or the environment.

If so, the Agency registers the product and specifies the language that must be used on the label. It is illegal to use a pesticide for purposes, or in a manner, other than specifically directed on the label.

For instance, a label might specify that the product in question can be used only for killing rodents and that children and pets should not be allowed to come into contact with the compound. If someone hired a pest control service that used the product to kill bats in the attic and then allowed the family dog to eat some of the poison, the pest control service could be prosecuted by EPA.

EPA and the States routinely collect and analyze pesticides to ensure that they are labeled according to their EPA registration. In very serious cases of mislabeling, such as when antidote instructions are incorrect, EPA issues "stop sale" orders to avert serious injury.

The Region 5 Pesticides Section is responsible for seeing that pesticides are used safely and properly in the six-State Midwestern region and that manufacturers comply with their responsibilities under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

In order to do this, the pesticides section:

- Monitors pesticide use by professional pest control operators, aerial applicators, homeowners, industry officials, and farmers.
- Protects the public by ordering manufacturers to stop sales when their products violate the terms of the law.
- Assesses fines for major violations of FIFRA.
- Supervises State inspections of the 3,600 pesticide manufacturers in the Region.
- Oversees State-administered pesticide compliance programs.

Most of the day-to-day aspects of the pesticides program are handled by the six States in Region 5: Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin. EPA, through its grants program, provides much of the money needed by the States to run an effective pesticides program.

Pesticide programs are usually run by State agriculture departments. Pesticides specialists in these departments train and certify applicators to work with certain highly toxic, restricted-use chemicals. As of September 30, 1984, there were 89,000 certified private and 26,000 commercial applicators in Region 5.

The States, in cooperation with EPA, also are auditing laboratories to ensure the accuracy of data submitted to EPA by manufacturers, monitoring pesticide importers and exporters, and enforcing the law.

The following pesticides specialists work in Region 5 States and are available to answer your questions.

ILLINOIS
Tom Walker
Department of Agriculture
(217) 785-8462

Harvey Dominick
Department of Public Health
(217) 782-4674

INDIANA
L. O. Nelson
State Chemist's Office
(317) 494-1587

MICHIGAN
Robert Mesecher
Department of Agriculture
(513) 373-1087

MINNESOTA
William Bulger
Department of Agriculture
(612) 296-1161

OHIO
Oren Spilker
Department of Agriculture
(614) 866-6361

WISCONSIN
William Simmons
Department of Agriculture,
Trade and Consumer Protection
(608) 266-7135

U.S. EPA, CHICAGO
Phyllis Reed, Chief
Pesticides Section
(312) 353-2192

Pesticides Update

EDITOR'S NOTE:

About 50,000 pesticide products, composed of 600 basic chemical active ingredients, have been registered for use in the United States since 1947. Since many of them were approved when knowledge of health and environmental effects was far more limited, EPA is reregistering these compounds using current scientific standards.

If data show that a product can be used without unreasonably affecting public health or the environment, EPA will reregister the product for use. If at any time after the pesticide is registered by EPA there is new evidence that casts doubt on its safety, EPA must conduct further risk/benefit evaluations to see if new regulatory action should be taken.

If data indicate a possible unacceptable risk, the Agency begins the *special review* process. This process considers acute toxicity, chronic toxicity (including cancer, birth defects and sterility), significant reductions in wildlife species, or the lack of an antidote for emergency treatment.

The special review may result in a determination to cancel the registration or restrict use of the chemical.

ALACHLOR

EPA recently placed additional restrictions on alachlor, the largest-volume herbicide sold in the United States. Alachlor, known by the trade name Lasso, is widely used to control weeds in corn and soybean crops.

Use of alachlor on potato crops is now prohibited, as are applications of the herbicide from crop dusting planes.

The Agency has determined that alachlor could pose a substantial cancer risk to persons working with the compound and is therefore subjecting it to a special review process in which EPA will assess all the risks and benefits of alachlor before deciding if it should be allowed to remain on the market.

Monsanto Co., the manufacturer of alachlor, has agreed to make special training programs available to all potential users of the herbicide before the 1985 planting season. The training will outline safeguards to be followed when using the product and will be held in all parts of the country.

EPA has required Monsanto to revise alachlor labels to include the following information:

—A statement that alachlor causes tumors in laboratory animals.

—Handling instructions designed to reduce worker exposure to the product.

—A statement that the compound has been found in limited ground-water testing and could run off into rivers and streams.

—Instructions for wearing goggles, rubber gloves, boots, trousers and long-sleeved shirts during mixing and loading operations and during cleaning and repair.

AMITROLE

EPA began a special review of amitrole in May, 1984, based on evidence that it causes tumors in laboratory animals. Amitrole is a herbicide used to control grasses and broadleaf weeds, mainly along highways. Large-scale use of the compound has been restricted during the review process.

DAMINOZIDE

EPA has undertaken a special review of all pesticides containing the active ingredient daminozide. This compound, which is used primarily on peanut and apple crops, causes cancer in laboratory animals and has been detected in raw agricultural products as well as processed food.

A hydroloysis product of daminozide also causes cancer and mutagenic effects in laboratory animals. This compound is unsymmetrical 1,1-demethylhydrazine (UDMH) and is of special concern because UDMH is formed when apples are processed or cooked. The compound has been detected in apple juice and sauce.

Daminozide is used in apple orchards to delay the fruit ripening process, thereby extending the harvesting period. It also improves the color of apples and makes them firmer, increasing storage life and preventing bruising and rotting during transport.

In peanuts, daminozide stimulates upright growth of the plant, allowing increased air circulation and light penetration. It also reduces disease and insect problems and increases harvesting efficiency.

Daminozide is most often sold under the trade name Alar.

DICOFOL

EPA has proposed cancelling the pesticide dicofol because it may contain DDT and other impurities that are hazardous to fish and the birds that feed on fish.

Approximately 2.5 million pounds of dicofol are used in the U.S. each year, primarily in Arizona, California, Florida and Texas to control mites on cotton and citrus.

Of concern to EPA is the 10 percent of the product that contains DDT and related compounds DDE, DDD and tetrachloro-DDT. These compounds, collectively known as DDTr, can affect the reproductive abilities of fish and birds.

DDT, once widely used to control insects, was banned by EPA in 1972 because of its persistence in the environment and its harmful effects on wildlife.

Dicofol was the subject of a special review required by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). After evaluating the risks and benefits of dicofol, EPA determined that its risks to the environment outweigh any benefits.

Dicofol was first registered in 1957. It is known by the trade names Acarin, Kelthane and Mitigan.

ETHYLENE DIBROMIDE

EPA has suspended the use of ethylene dibromide as a fumigant on grain, soil, citrus and tropical fruits after EDB residues were detected in raw and cooked foods and in ground water.

The Agency took this action last spring based on evidence that EDB could induce cancer in laboratory animals, as well as posing the threat of tumors, genetic mutations, and birth defects.

Because EDB residues were found in food, EPA has proposed lowering the allowable levels of these residues in products ranging from raw grain to flour and ready-to-eat products.

LARVADEX (cyromazine)

EPA is still determining if the pesticide larvadex should be registered for use as a chicken-feed additive to help combat the avian flu. Although the Agency allowed the emergency use of larvadex in four States during 1983 and 1984, it will wait for adequate health data before making a final decision on the compound's use.

LINURON

The Agency initiated a special review of linuron in September, 1984, after determining that it causes cancer in rats and mice. The herbicide, widely used on soybeans, other foods and non-agricultural sites, will continue to be available on a restricted use basis during the review process.

PENTACHLOROPHENOL

EPA has proposed cancelling most non-wood uses of pentachlorophenol (PCP) after determining that continued use may pose unreasonable public health risks.

This action is based on data showing that PCP causes birth defects in the offspring of laboratory animals. It contains dibenzo-p-dioxin (HxCDD) and hexachlorobenzene (HCB), both of which cause cancer in laboratory animals.

PCP, in addition to its function as a wood preservative, is used as a herbicide, disinfectant, defoliant, for moss control, and as an anti-microbial agent.

EPA has decided that continued use of PCP for other than wood preservative functions would pose an unreasonable risk to human health and the environment. In most cases, acceptable substitutes are available.

However, PCP will still be registered as an anti-fungal agent in oil well flood waters and in pulp and paper mill solution. EPA has decided that the benefits of continued use in these circumstances outweigh the risks.

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GLOSSARY

Asbestos
A building and insulating material widely used for years because of its strength and heat-resistant qualities. When not completely sealed in a product, it can break into microscopic fibers that can float almost indefinitely in air. If inhaled, the fibers can cause asbestosis—a severe lung ailment, certain types of cancer, and other respiratory problems.

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)
Also known as Superfund, this law authorizes the Federal government to respond directly to releases of hazardous substances that may endanger public health, welfare or the environment. It also provides money, through a tax on chemicals, for cleaning up abandoned hazardous waste dumps.

Dioxin
A generic term for a group of 75 related compounds known as polychlorinated dibenzo-p-dioxins. However, the term usually refers to the most toxic and widely known of the group—2,3,7,8-TCDD. Dioxin is not produced intentionally; it is an undesired byproduct in the manufacture of several commercial substances, chiefly the pesticide 2,4,5-TCP. Dioxin was a contaminant in Agent Orange, the defoliant used during the Viet Nam War. Dioxin is a suspected human carcinogen and can produce a painful skin rash known as chloracne. EPA is performing a nationwide study to determine the extent of dioxin in the environment.

Federal Insecticide, Rodenticide and Fungicide Act (FIFRA)
Regulates the 50,000 pesticides in use in the United States. Provides for: premarket clearance (registration) of pesticides to prevent unreasonable hazards to humans or the environment; classification of pesticides for specific uses; certification of pesticide applicators; informative and accurate labeling of pesticides; and enforcement to ensure proper pesticide practices. The Agency is now reregistering the 600 active ingredients found in U.S. pesticide products to ensure that they pose no unreasonable risks in light of currently available scientific information.

National Priorities List (NPL)
A list of 812 sites in the U.S. now eligible for Superfund-financed cleanups. One hundred and ninety-two of these sites are in Region 5. The NPL is expected to include as many as 2,000 sites by the year 2000; Region 5's share may be 440.

Polychlorinated biphenyls (PCB's)
PCB's are a family of organic compounds used since 1926 as an insulating and dielectric fluid in electrical transformers and capacitors and in hydraulic systems. EPA banned the manufacture of PCB's in 1979 because of their persistence in the environment, but PCB's still are allowed in electrical transformers and capacitors. PCB's are not as toxic in acute doses as other chemicals, but can cause a painful skin rash. Ubiquitous in the environment, the compounds, accumulate in the fatty tissues of humans and animals.

Resource Conservation and Recovery Act (RCRA)
Enacted in 1976 and amended by Congress last year, RCRA regulates hazardous waste management practices by licensing hazardous waste treatment, storage, and disposal facilities and by tracking wastes, via a manifest system, from their creation until their disposal. The law provides for criminal penalties in certain cases.

Remedial Investigation/Feasibility Study (RI/FS)
The RI/FS is a two-part study completed before long-term work at a Superfund site can begin. The Remedial Investigation (RI) is a study of the nature and extent of the problem at the site. The Feasibility Study (FS) is an evaluation of different methods of dealing with the problem and a recommendation of the one that will most effectively protect public health and the environment.

Toxic Substances Control Act (TSCA)
Passed in 1976, this law gives EPA the authority to gather certain basic information from chemical manufacturers regarding health risks. The law also requires manufacturers to notify EPA 90 days before making a new chemical substance. TSCA allows EPA to regulate unreasonable risks at any stage in a chemical's life—manufacturing, processing, distribution, use or disposal. PCB regulations and the Agency's asbestos-in-schools rule were promulgated under the authority of TSCA.

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